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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Tony Albrecht

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EXAMINER

NGUYEN, PHILLIP

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/579,528	Applicant(s) ALBRECHT ET AL.	
	Examiner PHILLIP NGUYEN	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/15/06</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 9 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the semiconductor **layer** device" in 10. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 fails to further limit the claimed invention by not providing any "other optical characteristics."

Claim 19 recites "wherein the quantum well structures **can** contain" which is not clear what applicant intends to claim. Therefore it is Examiner's position to provide a broadest reasonable interpretation to this context where "can" does not limit the claimed invention but it provides the capabilities of the claimed component. Hence, the claim fails to further limit the invention.

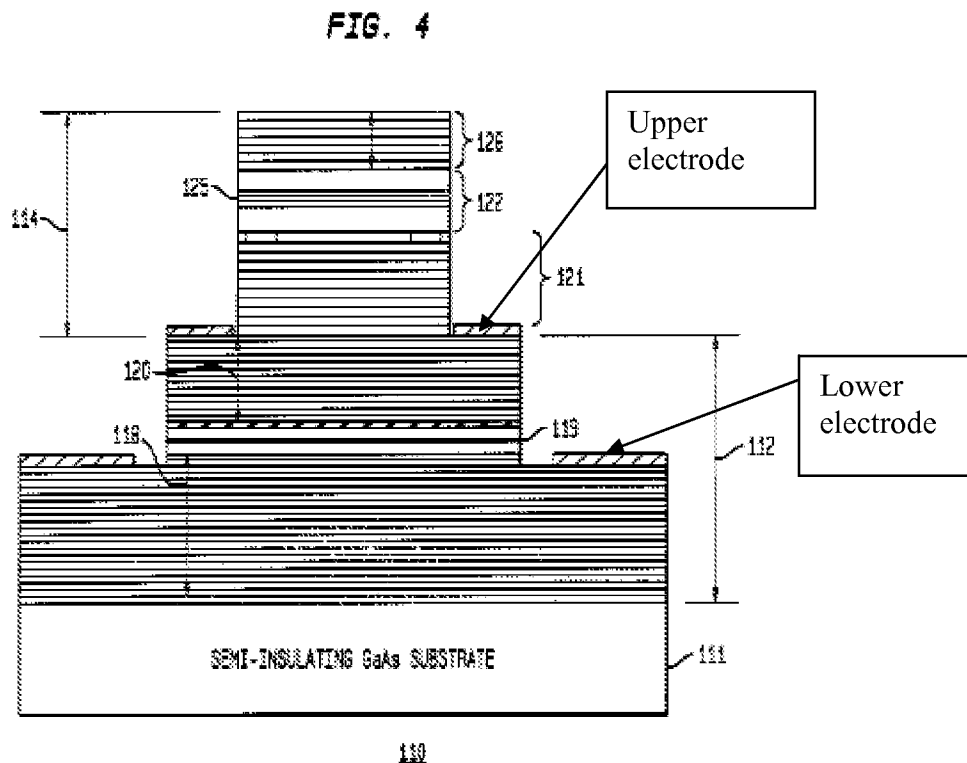
Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 8, 11-13, and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Cunningham (US 6434180).



With respect to claim 1, Cunningham discloses in Fig. 4 a semiconductor laser device comprising:

an optically pumped surface-emitting vertical emitter region 114 which has an active radiation-emitting vertical emitter layer 175; and

at least one monolithically integrated pump radiation source 112 for optically pumping the vertical emitter, which has an active radiation-emitting pump layer 119, wherein the pump layer 119 follows the vertical emitter layer 125 in the vertical direction;

a conductive layer (upper electrode) provided between the vertical emitter layer 114 and the pump layer 119; and

a contact (lower electrode) is applied on the side of the semiconductor layer device which is closer to the pump layer than to the conductive layer;

whereby an electrical field can be applied between the conductive layer and the contact for generating pump radiation by charge carrier injection.

With respect to claim 2, Cunningham discloses the conductive layer is partially exposed; therefore it is considered "partially ablated."

With respect to claim 7, the conductive layer 7 is arranged vertically in such a manner that it is in a node of the radiation field in the resonator of the vertical emitter region.

With respect to claim 8, Cunningham discloses a vertical waveguide structure 121 is provided between the vertical emitter layer 125 and the conductive layer (lower electrode).

With respect to claims 11-12, Cunningham discloses the pump layer and the vertical emitter layer being followed in the vertical direction by an internal cavity reflective structure which is a Bragg reflector structure 118.

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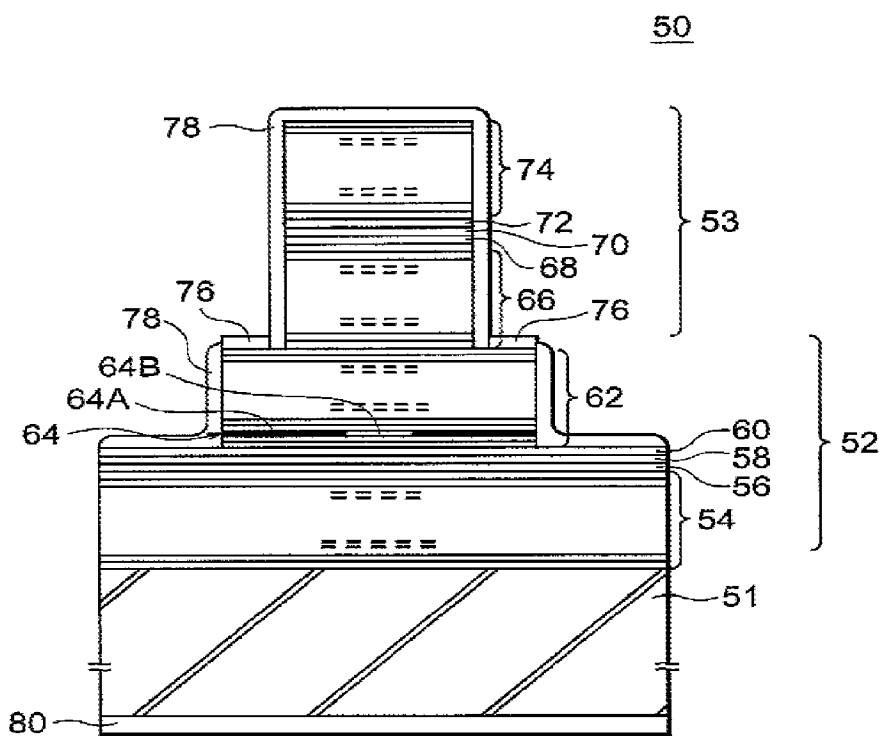
With respect to claim 13, it is clear in Fig. 4 that the internal cavity structure 118 is arranged between the vertical emitter layer 125 and a substrate 111 and the radiation generated by the vertical emitter layer is launched on the side opposite the substrate.

With respect to claim 18, Cunningham discloses the vertical emitter layer and/or the pump layer in each case have one or more quantum well structures (col. 6, lines 1-7).

With respect to claim 19, Cunningham discloses the quantum well structures "**can**" contain quantum dots (col. 6, 43-54).

3. Claims 1 and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Iwai (US 20020146053).

FIG. 3



With respect to claim 1, Iwai discloses in Fig. 4 a semiconductor laser device comprising:

an optically pumped surface-emitting vertical emitter region 53 which has an active radiation-emitting vertical emitter layer 70; and

at least one monolithically integrated pump radiation source 52 for optically pumping the vertical emitter, which has an active radiation-emitting pump layer 58, wherein the pump layer 58 follows the vertical emitter layer 70 in the vertical direction;

a conductive layer 76 provided between the vertical emitter layer 70 and the pump layer 58; and

a contact 80 is applied on the side of the semiconductor layer device which is closer to the pump layer than to the conductive layer;

whereby an electrical field can be applied between the conductive layer and the contact for generating pump radiation by charge carrier injection.

With respect to claims 18-19, Iwai discloses the vertical emitter layer and/or the pump layer in each case have one or more quantum well structures (paragraphs 0042 and 0049).

4. Claims 1-2, 4, and 7-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Jiang (US 20020054618).

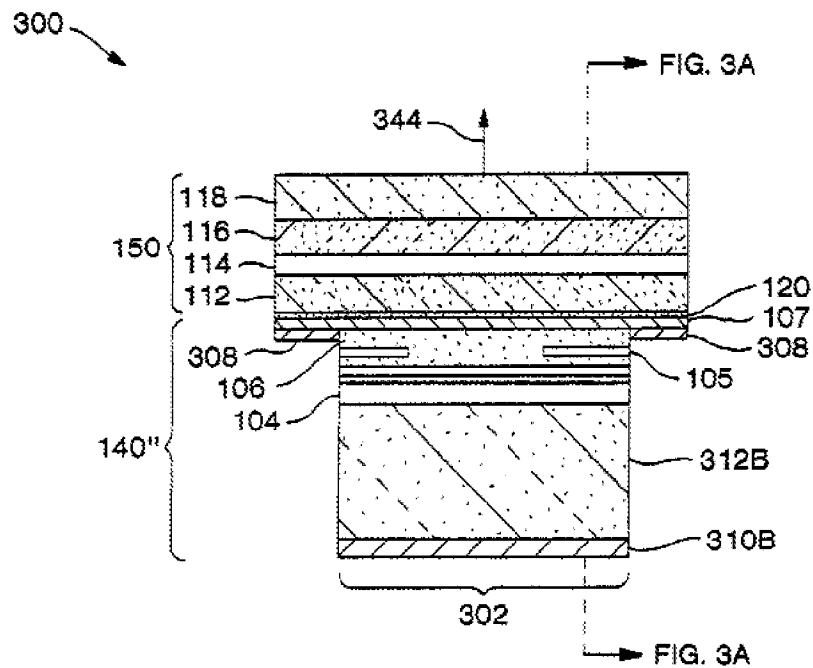


FIG. 3B

With respect to claim 1, Jiang discloses in Fig. 3B a semiconductor laser device comprising:

an optically pumped surface-emitting vertical emitter region 150 which has an active radiation-emitting vertical emitter layer 114; and

at least one monolithically integrated pump radiation source 140” for optically pumping the vertical emitter, which has an active radiation-emitting pump layer 104, wherein the pump layer 104 follows the vertical emitter layer 114 in the vertical direction;

a conductive layer 107 provided between the vertical emitter layer 114 and the pump layer 104; and

a contact 310B is applied on the side of the semiconductor layer device which is closer to the pump layer than to the conductive layer;

whereby an electrical field can be applied between the conductive layer and the contact for generating pump radiation by charge carrier injection.

With respect to claims 2 and 4, Jiang discloses the semiconductor laser device is partially ablated so that the conductive layer 107 is partially exposed (paragraph 0044) and a further contact 308 is applied to the exposed areas of the conductive layer 107.

With respect to claim 7, Jiang discloses the conductive layer 107 being arranged vertically in such a manner that is located in a node of the radiation field in the resonator of the vertical emitter region.

With respect to claim 8, Jiang discloses a waveguide structure 112 being provided between the vertical emitter 114 and the conductive layer 107.

With respect to claim 9, since the waveguide structure 112 being aligned with both contact 310B and further contact 308.

With respect to claim 10, since the vertical waveguide structure 112 made of material containing Aluminum (paragraph 0037), it is believed that the waveguide structure 112 is oxidized.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (US 20020054618) in view of Jewell (US 5719891). Jiang discloses the claimed invention except for the parallel trenches. Jewell discloses throughout the patent the etched trenches in VCSEL. It would have been obvious to one skill in the art at the time the invention was made to provide parallel trenches as taught by Jewell to Jiang in order to oxidize the DBR to provide the current aperture.
6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jiang (US 20020054618). Jiang discloses the claimed invention except for explicitly teaching the etch stop layer which is resistant to an etching process which is suitable for exposing the conductive layer is provided adjacent to the conductive layer. It would have been obvious to one skill in the art at

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the time the invention was made to provide an etch stop layer to prevent the etching process as desired because this technique is well known in the art for etching process.

7. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cunningham (US 6434180) in view of Spinelli (US 6370168).

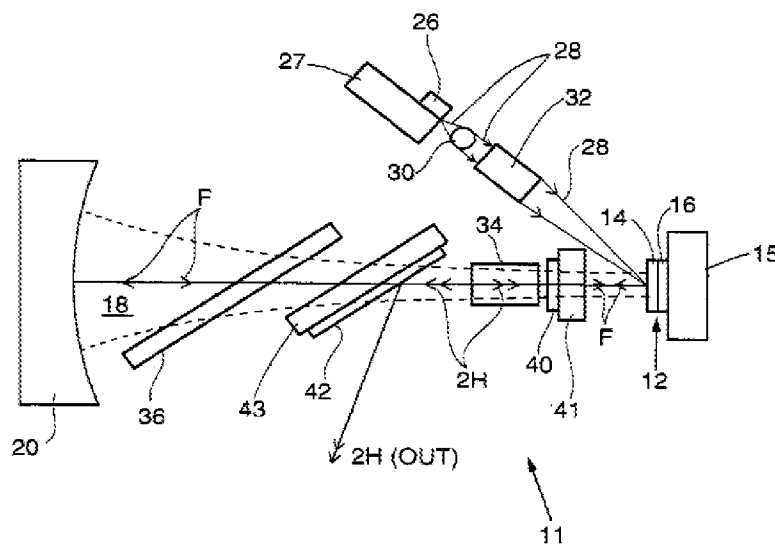


FIG. 2

Cunningham discloses the claimed invention except for the vertical emitter being associated with an external resonator reflector which together with the internal cavity reflective structure, forms a resonator for the vertical emitter region, beam-shaping elements, frequency-selective elements, and frequency-converting elements are arranged in the resonator. Spinelli discloses a VCSEL as shown in Fig. 2 with an external cavity including an external resonator mirror 20, and frequency-converting element 34, frequency selecting elements 36, 40, 42.

It would have been obvious to one skill in the art at the time the invention was made to provide an external resonator reflector and the listed components inside the resonator because it has been known in the art to use an external resonator to obtain desired laser light through the

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optical elements such as optical lens, grating, frequency converting elements like nonlinear crystals as taught by Spinelli.

Communication Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phillip Nguyen whose telephone number is 571-272-1947. The examiner can normally be reached on 9:00 AM - 6:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MINSUN HARVEY, can be reached on 571-272-1835. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Phillip Nguyen/

AU 2828

/Minsun Harvey/
Supervisory Patent Examiner, Art Unit 2828